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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/901,972	07/09/2001	Fernando Pedone	10010654-1	7275

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EXAMINER	
LOHN, JOSHUA A	

ART UNIT	PAPER NUMBER
2114	

DATE MAILED: 12/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/901,972	PEDONE ET AL.	
	Examiner	Art Unit	
	Joshua A Lohn	2114	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 October 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16 and 18-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *12* is/are allowed.

6)☒ Claim(s) *1,3-11,15,16 and 18-25* is/are rejected.

7)☒ Claim(s) *13,14 and 26-28* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments, see 14-17, filed 10/18/2004, with respect to the rejection(s)of claim(s) 1-11 and 15-25 under 35 USC 103 have been fully considered and are persuasive due to the ineligibility of the secondary reference. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made under Wisner in view of Song and Oracle 8: SQL Reference.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3-11, 15, 16, 19, 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wisner et al., United States Patent Application Publication 2002/0163910, filed May 1, 2001 in view of Song, United States Patent number 6,421,688, filed March 2, 2000.

As per claim 1, Wisner discloses a distributed data center system protocol that includes providing a client having a failure detector (Wisner, ¶0025) and a plurality of data centers (Wisner, ¶0021) each including a plurality of database servers (Wisner, ¶0028). Wisner also discloses the selecting one of the plurality of data centers to be a primary data center with the other of the plurality of data centers to be a backup data center (Wisner, ¶0067) and providing communications from the client to the primary database server and the backup database servers

(Wisner, ¶0024, ¶0026, Figure 1). Wisner fails to explicitly state the selecting of primary and backup database servers, the selecting of new primaries during failure, and adjusting communications in the event of a failure. Wisner does teach these aspects in use with the data movers.

Wisner discloses selecting one of the plurality of data movers in the primary data center to be a primary data mover with the other of the plurality of data movers therein to be a backup data mover (Wisner, ¶0052) and the plurality of data movers in the backup data center to be backup data movers (Wisner, ¶0054). Wisner also discloses selecting one of the backup data movers as a new primary data mover when one of the backup data movers detects a failure of the primary data mover (Wisner, ¶0052, where detection comes via controller); and providing further communications from the client to the new primary data mover when the client suspects a failure of the primary data mover (Wisner, ¶0025).

It would have been obvious to one skilled in the art at the time of the invention to treat the database servers of Wisner in the same fashion as the data movers.

This would have been obvious because Wisner discloses having multiple database servers (Wisner, ¶0028). Wisner further discloses a desire to avoid service disruption to the users of the various servers (Wisner, ¶0029), and a desire to have a configuration to provide redundant resources at both data centers (Wisner, ¶0035). Wisner discloses having plural data movers in both data centers to provide improved reliability in both the individual data center and in the system as a whole (Wisner, ¶0054). The database servers and data movers exist in similar configurations, each data center having a plurality. This similarity of structure would have provided motivation for one of ordinary skill in the art to apply similar active and backup

characteristics, as those shown with the data movers (Wisner, ¶0052), to the database servers. This would obviously have improved the overall reliability as seen by the user and desired by Wisner (Wisner, ¶0028). The result of this reconfiguration would have been database servers with the same failover structure and characteristics as those exhibited by the data movers.

Wisner fails to disclose providing an abort operation.

Song discloses providing an abort operation from the client to the primary database server when the client suspects a failure of the primary database server (Song, col. 6, line 54, where the client execution is aborted when failure is suspected).

It would have been obvious to one skilled in the art at the time of the invention to include the abort abilities of Song in the invention of Wisner.

This would have been obvious to provide an ability to abort transactions, so that a client does not remain waiting indefinitely for a reply from a faulty device as may happen without the ability to abort in the invention of Wisner. This abort also allows for the release of resources that may have otherwise been occupied in a failed operation (Song, figure 2B, where the server down condition allows the client connection to terminate the execution and release resources).

As per claim 3, Wisner discloses a distributed data center system protocol that includes providing a client having a failure detector (Wisner, ¶0025) and a plurality of data centers (Wisner, ¶0021) each including a plurality of database servers (Wisner, ¶0028). Wisner also discloses the selecting one of the plurality of data centers to be a primary data center with the other of the plurality of data centers to be a backup data center (Wisner, ¶0067) and providing communications from the client to the primary database server and the backup database servers

(Wisner, ¶0024, ¶0026, Figure 1). Wisner fails to explicitly state the selecting of primary and backup database servers, the selecting of new primaries during failure, and adjusting communications in the event of a failure. Wisner does teach these aspects in use with the data movers.

Wisner discloses selecting one of the plurality of data movers in the primary data center to be a primary data mover with the other of the plurality of data movers therein to be a backup data mover (Wisner, ¶0052) and the plurality of data movers in the backup data center to be backup data movers (Wisner, ¶0054). Wisner also discloses selecting one of the backup data movers as a new primary data mover when one of the backup data movers detects a failure of the primary data mover (Wisner, ¶0052, where detection comes via controller); and providing further communications from the client to the new primary data mover when the client suspects a failure of the primary data mover (Wisner, ¶0025).

It would have been obvious to one skilled in the art at the time of the invention to treat the database servers of Wisner in the same fashion as the data movers.

This would have been obvious because Wisner discloses having multiple database servers (Wisner, ¶0028). Wisner further discloses a desire to avoid service disruption to the users of the various servers (Wisner, ¶0029), and a desire to have a configuration to provide redundant resources at both data centers (Wisner, ¶0035). Wisner discloses having plural data movers in both data centers to provide improved reliability in both the individual data center and in the system as a whole (Wisner, ¶0054). The database servers and data movers exist in similar configurations, each data center having a plurality. This similarity of structure would have provided motivation for one of ordinary skill in the art to apply similar active and backup

characteristics, as those shown with the data movers (Wisner, ¶0052), to the database servers. This would obviously have improved the overall reliability as seen by the user and desired by Wisner (Wisner, ¶0028). The result of this reconfiguration would have been database servers with the same failover structure and characteristics as those exhibited by the data movers.

Wisner fails to disclose ensuring that each transaction is only executed once.

Song discloses checking whether the primary database server has already executed a transaction operation for a transactional job corresponding to the same transactional job before executing the transaction operation (Song, col. 7, lines 45-57, where the locking, first-come-first-server policy ensures that an inherent check is made in ensuring that the transactions are processed singly and sequentially).

It would have been obvious to one skilled in the art at the time of the invention to include the checking aspects of Song in the invention of Wisner.

This would have been obvious because Wisner discloses a strong desire to provide reliable and functional services (Wisner, ¶0003). Song provides an interface face that aids the reliable multi-server environment by ensuring that a true replicated state exists, and that no incorrect transactions are executed by any aspect of the system. It would have been obvious to one skilled in the art at the time that the checking of Song would have benefited Wisner by providing a more reliable system of execution.

As per claim 4, Wisner additionally discloses providing the plurality of database servers includes providing local databases therefor; and providing the communications includes the primary database server sending a transaction operation to the local database and executing the

transaction operation (Wisner, ¶0026).

As per claim 5, Wisner additionally discloses providing a transaction operation from the client to the primary database server and the backup database servers; and executing the transaction operation and a second transaction operation in the same order both in the primary database server and the backup database server (Wisner, ¶0037).

As per claim 6, Wisner additionally discloses providing first and second durability levels of operation wherein employing the first durability level in the primary database server executes the transaction operation faster than the second durability level of operation (Wisner, ¶0037, where the first durability level "does not follow up on whether... changes were received", and the second durability level "waits for a message sent by the standby site", which would decrease operation speed).

As per claim 7, Wisner additionally discloses providing the plurality of database servers in the primary and backup data centers includes each of the plurality of database servers having failure detectors (Wisner, ¶0061) and the client having a failure detector with properties of strong completeness and eventual weak accuracy (Wisner, ¶0043, where the intelligent controller is connected to the client through the WAN and will exhibit strong completeness by detecting errors through failure information from the data centers, but eventual weak accuracy because it will only suspect failure when failure information is received).

As per claim 8, Wisner additionally discloses providing the client includes providing the client with disaster detectors with properties of strong completeness (Wisner, ¶0043, where the intelligent controller is connected to the client through the WAN and will exhibit strong completeness by detecting errors through the monitored failure information) and eventual strong accuracy (Wisner, ¶0063, where the eventual strong accuracy comes from the monitoring that is continual and will suspect a system of failure, and monitor to detect it, even if no failure has occurred).

As per claim 9, Wisner additionally discloses providing the plurality of database servers in the primary and backup data centers includes each of the plurality of database servers having disaster detectors with properties of strong completeness and strong accuracy (Wisner, ¶0061, where the layers within the data centers will detect all errors, strong completeness, but only will suspect errors when a fault has already been detected within the layer, or connecting layers, strong accuracy).

As per claim 10, Wisner additionally discloses providing the primary database server includes providing a local database therefor; and executing a transaction operation includes the primary database server sending the transaction operation to the local database (Wisner, ¶0026).

As per claim 11, Wisner discloses a distributed data center system protocol that includes providing a client having a failure detector (Wisner, ¶0025) and a plurality of data centers (Wisner, ¶0021) each including a plurality of database servers (Wisner, ¶0028). Wisner also

discloses the selecting one of the plurality of data centers to be a primary data center with the other of the plurality of data centers to be a backup data center (Wisner, ¶0067) and providing communications from the client to the primary database server and the backup database servers (Wisner, ¶0024, ¶0026, Figure 1). Wisner fails to explicitly state the selecting of primary and backup database servers, the selecting of new primaries during failure, and adjusting communications in the event of a failure. Wisner does teach these aspects in use with the data movers.

Wisner discloses selecting one of the plurality of data movers in the primary data center to be a primary data mover with the other of the plurality of data movers therein to be a backup data mover (Wisner, ¶0052) and the plurality of data movers in the backup data center to be backup data movers (Wisner, ¶0054). Wisner also discloses selecting one of the backup data movers as a new primary data mover when one of the backup data movers detects a failure of the primary data mover (Wisner, ¶0052, where detection comes via controller); and providing further communications from the client to the new primary data mover when the client suspects a failure of the primary data mover (Wisner, ¶0025).

It would have been obvious to one skilled in the art at the time of the invention to treat the database servers of Wisner in the same fashion as the data movers.

This would have been obvious because Wisner discloses having multiple database servers (Wisner, ¶0028). Wisner further discloses a desire to avoid service disruption to the users of the various servers (Wisner, ¶0029), and a desire to have a configuration to provide redundant resources at both data centers (Wisner, ¶0035). Wisner discloses having plural data movers in both data centers to provide improved reliability in both the individual data center and in the

system as a whole (Wisner, ¶0054). The database servers and data movers exist in similar configurations, each data center having a plurality. This similarity of structure would have provided motivation for one of ordinary skill in the art to apply similar active and backup characteristics, as those shown with the data movers (Wisner, ¶0052), to the database servers. This would obviously have improved the overall reliability as seen by the user and desired by Wisner (Wisner, ¶0028). The result of this reconfiguration would have been database servers with the same failover structure and characteristics as those exhibited by the data movers.

Wisner additionally discloses keeping the backup data current (Wisner, ¶0037), but fails to disclose the transaction parameters to be broadcast during a transaction.

Song discloses communicating from the primary database server to the backup database servers by broadcast communication of a transaction unique identification, statements associated with the transaction operation, and control information from the primary database server to the backup database server (Song, col. 3, lines 60-66, where all the servers have instant transaction replication, which would inherently broadcast all information relating to a transaction received at one server to all other servers, this would include transaction identification to uniquely identify each type, operation information, and control information, all of which are essential to transaction replication)

It would have been obvious to one skilled in the art at the time of the invention to include the broadcast communication of Song in the invention of Wisner to ensure proper replication from the primary database to the secondary database.

This would have been obvious because Wisner discloses a strong desire to provide reliable and functional services (Wisner, ¶0003). Song provides an interface face that aids the

reliable multi-server environment by ensuring that a true replicated state exists, and that no incorrect transactions are executed by any aspect of the system. It would have been obvious to one skilled in the art at the time that the broadcasting of Song would have benefited Wisner by providing a more reliable system of execution.

As per claim 15, Wisner discloses providing a client having a failure detector (Wisner, ¶0025) and a plurality of data centers (Wisner, ¶0021) each including a plurality of database servers (Wisner, ¶0028) operatively interconnected (Wisner, ¶0026). Wisner further discloses selecting one of the plurality of data centers to be a primary data center with the other of the plurality of data centers to be a backup data center (Wisner, ¶0067), providing a transaction operation from the client to the primary database server and the backup database servers (Wisner, ¶0024, ¶0026, Figure 1), and providing error messages from the backup database servers to the client indicating that the backup database servers are not the primary database server (Wisner, ¶0034, where the error would be indicated to all systems attached to the backup unit). Wisner fails to explicitly state the selecting of primary and backup database servers, the selecting of new primaries during failure, and adjusting communications in the event of a failure. Wisner does teach these aspects in use with the data movers.

Wisner discloses selecting one of the plurality of data movers in the primary data center to be a primary data mover with the other of the plurality of data movers in the primary data center to be a backup data mover (Wisner, ¶0052) and the plurality of data movers in the backup data center to be backup data movers (Wisner, ¶0054) and executing the transaction operation by the primary data mover (Wisner, ¶0052). Wisner also discloses selecting one of the backup

data movers as a new primary data mover when one of the backup data movers detects a failure of the primary data mover (Wisner, ¶0052, where detection comes via the controller) and selecting one of the backup data movers as a new primary data mover when one of the backup data movers suspects a failure of the primary data mover (Wisner, ¶0052, where lack or response is a suspicion of failure). Wisner discloses also providing the transaction operation from the client to the new primary data mover when the client detects a failure or change of the primary data mover (Wisner, ¶0025), executing the transaction operation by the new primary data mover when the transaction operation is provided from the client to the new primary data mover (Wisner, ¶0052), and returning the result of the executed transaction operation from the new primary data mover to the client (Wisner, ¶0052, where the interaction with the file system would provide results to the client through any interface servers).

It would have been obvious to one skilled in the art at the time of the invention to treat the database servers of Wisner in the same fashion as the data movers.

This would have been obvious because Wisner discloses having multiple database servers (Wisner, ¶0028). Wisner further discloses a desire to avoid service disruption to the users of the various servers (Wisner, ¶0029), and a desire to have a configuration to provide redundant resources at both data centers (Wisner, ¶0035). Wisner discloses having plural data movers in both data centers to provide improved reliability in both the individual data center and in the system as a whole (Wisner, ¶0054). The database servers and data movers exist in similar configurations, each data center having a plurality. This similarity of structure would have provided motivation for one of ordinary skill in the art to apply similar active and backup characteristics, as those shown with the data movers (Wisner, ¶0052), to the database servers.

This would obviously have improved the overall reliability as seen by the user and desired by Wisner (Wisner, ¶0028). The result of this reconfiguration would have been database servers with the same failover structure and characteristics as those exhibited by the data movers.

Wisner, however, fails to disclose ensuring that each transaction is only executed once.

Song discloses checking whether the primary database server has already executed a transaction operation for a transactional job corresponding to the same transactional job before executing the transaction operation (Song, col. 7, lines 45-57, where the locking, first-come-first-server policy ensures that an inherent check is made in ensuring that the transactions are processed singly and sequentially).

It would have been obvious to one skilled in the art at the time of the invention to include the checking aspects of Song in the invention of Wisner.

This would have been obvious because Wisner discloses a strong desire to provide reliable and functional services (Wisner, ¶0003). Song provides an interface face that aids the reliable multi-server environment by ensuring that a true replicated state exists, and that no incorrect transactions are executed by any aspect of the system. It would have been obvious to one skilled in the art at the time that the checking of Song would have benefited Wisner by providing a more reliable system of execution.

As per claim 16, Wisner discloses providing a client having a failure detector (Wisner, ¶0025) and a plurality of data centers (Wisner, ¶0021) each including a plurality of database servers (Wisner, ¶0028) operatively interconnected (Wisner, ¶0026). Wisner further discloses selecting one of the plurality of data centers to be a primary data center with the other of the

plurality of data centers to be a backup data center (Wisner, ¶0067), providing a transaction operation from the client to the primary database server and the backup database servers (Wisner, ¶0024, 0026, Figure 1), and providing error messages from the backup database servers to the client indicating that the backup database servers are not the primary database server (Wisner, ¶0034, where the error would be indicated to all systems attached to the backup unit). Wisner fails to explicitly state the selecting of primary and backup database servers, the selecting of new primaries during failure, and adjusting communications in the event of a failure. Wisner does teach these aspects in use with the data movers.

Wisner discloses selecting one of the plurality of data movers in the primary data center to be a primary data mover with the other of the plurality of data movers in the primary data center to be a backup data mover (Wisner, ¶0052) and the plurality of data movers in the backup data center to be backup data movers (Wisner, ¶0054) and executing the transaction operation by the primary data mover (Wisner, ¶0052). Wisner also discloses selecting one of the backup data movers as a new primary data mover when one of the backup data movers detects a failure of the primary data mover (Wisner, ¶0052, where detection comes via the controller) and selecting one of the backup data movers as a new primary data mover when one of the backup data movers suspects a failure of the primary data mover (Wisner, ¶0052, where lack or response is a suspicion of failure). Wisner discloses also providing the transaction operation from the client to the new primary data mover when the client detects a failure or change of the primary data mover (Wisner, ¶0025), executing the transaction operation by the new primary data mover when the transaction operation is provided from the client to the new primary data mover (Wisner, ¶0052), and returning the result of the executed transaction operation from the

new primary data mover to the client (Wisner, ¶0052, where the interaction with the file system would provide results to the client through any interface servers).

It would have been obvious to one skilled in the art at the time of the invention to treat the database servers of Wisner in the same fashion as the data movers.

This would have been obvious because Wisner discloses having multiple database servers (Wisner, ¶0028). Wisner further discloses a desire to avoid service disruption to the users of the various servers (Wisner, ¶0029), and a desire to have a configuration to provide redundant resources at both data centers (Wisner, ¶0035). Wisner discloses having plural data movers in both data centers to provide improved reliability in both the individual data center and in the system as a whole (Wisner, ¶0054). The database servers and data movers exist in similar configurations, each data center having a plurality. This similarity of structure would have provided motivation for one of ordinary skill in the art to apply similar active and backup characteristics, as those shown with the data movers (Wisner, ¶0052), to the database servers. This would obviously have improved the overall reliability as seen by the user and desired by Wisner (Wisner, ¶0028). The result of this reconfiguration would have been database servers with the same failover structure and characteristics as those exhibited by the data movers.

Wisner additionally fails to disclose providing an abort operation.

Song discloses providing an abort operation from the client to the primary database server when the client suspects a failure of the primary database server (Song, col. 6, line 54, where the client execution is aborted when failure is suspected).

It would have been obvious to one skilled in the art at the time of the invention to include the abort abilities of Song in the invention of Wisner.

This would have been obvious to provide an ability to abort transactions, so that a client does not remain waiting indefinitely for a reply from a faulty device as may happen without the ability to abort in the invention of Wisner. This abort also allows for the release of resources that may have otherwise been occupied in a failed operation (Song, figure 2B, where the server down condition allows the client connection to terminate the execution and release resources).

As per claim 19, Wisner additionally discloses providing a second transaction operation from the client to the primary database server and the backup database servers; and executing the transaction operation and the second transaction operation in the same order both in the primary database server and the backup database server (Wisner, ¶0037).

As per claim 21, Wisner additionally discloses providing the plurality of database servers in the primary and backup data centers includes each of the plurality of database servers having failure detectors (Wisner, ¶0061) and the client having a failure detector with the properties of: strong completeness wherein, if the primary database server fails at time t, then there is a time t'>t after which the primary database server is permanently suspected of failure by the client and by the backup database server; and eventual weak accuracy wherein, if the primary database server that does not fail, then there is a time after which the primary database server is never suspected of failure by the client and by the backup database server (Wisner, ¶0043, where the intelligent controller is connected to the client through the WAN and will exhibit strong completeness by detecting errors through failure information from the data centers, but eventual

weak accuracy because it will only suspect failure when failure information is received).

As per claim 22, Wisner additionally discloses providing the client includes providing the client with disaster detectors with the properties of: strong completeness wherein, if the primary data center fails at time t, then there is a time t'>t after which the primary data center is permanently suspected of failure by the client (Wisner, ¶0043, where the intelligent controller is connected to the client through the WAN and will exhibit strong completeness by detecting errors through the monitored failure information), and eventual strong accuracy wherein, if the primary data center that does not fail, then there is a time after which the primary data center is never suspected of failure by the client (Wisner, ¶0063, where the eventual strong accuracy comes from the monitoring that is continual and will suspect a system of failure, and monitor to detect it, even if no failure has occurred).

As per claim 23, Wisner additionally discloses providing the plurality of database servers in the primary and backup data centers includes each of the plurality of database servers having disaster detectors with the properties of: strong completeness wherein, if the primary data center fails at time t, then there is a time t'>t after which the primary data center is permanently suspected of failure by the backup database servers; and strong accuracy wherein, if the primary data center that does not fail, then the primary data center is never suspected of failure by the backup database servers (Wisner, ¶0061, where the layers within the data centers will detect all errors, strong completeness, but only will suspect errors when a fault has already been detected

within the layer, or connecting layers, strong accuracy).

As per claim 24, Wisner additionally discloses providing the primary database server includes providing a local database therefor; and executing the transaction operation includes the primary database server sending the transaction operation to the local database (Wisner, ¶0026).

As per claim 25, Wisner discloses providing a client having a failure detector (Wisner, ¶0025) and a plurality of data centers (Wisner, ¶0021) each including a plurality of database servers (Wisner, ¶0028) operatively interconnected (Wisner, ¶0026). Wisner further discloses selecting one of the plurality of data centers to be a primary data center with the other of the plurality of data centers to be a backup data center (Wisner, ¶0067), providing a transaction operation from the client to the primary database server and the backup database servers (Wisner, ¶0024, ¶0026, Figure 1), and providing error messages from the backup database servers to the client indicating that the backup database servers are not the primary database server (Wisner, ¶0034, where the error would be indicated to all systems attached to the backup unit). Wisner fails to explicitly state the selecting of primary and backup database servers, the selecting of new primaries during failure, and adjusting communications in the event of a failure. Wisner does teach these aspects in use with the data movers.

Wisner discloses selecting one of the plurality of data movers in the primary data center to be a primary data mover with the other of the plurality of data movers in the primary data center to be a backup data mover (Wisner, ¶0052) and the plurality of data movers in the backup data center to be backup data movers (Wisner, ¶0054) and executing the transaction operation

by the primary data mover (Wisner, ¶0052). Wisner also discloses selecting one of the backup data movers as a new primary data mover when one of the backup data movers detects a failure of the primary data mover (Wisner, ¶0052, where detection comes via the controller) and selecting one of the backup data movers as a new primary data mover when one of the backup data movers suspects a failure of the primary data mover (Wisner, ¶0052, where lack or response is a suspicion of failure). Wisner discloses also providing the transaction operation from the client to the new primary data mover when the client detects a failure or change of the primary data mover (Wisner, ¶0025), executing the transaction operation by the new primary data mover when the transaction operation is provided from the client to the new primary data mover (Wisner, ¶0052), and returning the result of the executed transaction operation from the new primary data mover to the client (Wisner, ¶0052, where the interaction with the file system would provide results to the client through any interface servers).

It would have been obvious to one skilled in the art at the time of the invention to treat the database servers of Wisner in the same fashion as the data movers.

This would have been obvious because Wisner discloses having multiple database servers (Wisner, ¶0028). Wisner further discloses a desire to avoid service disruption to the users of the various servers (Wisner, ¶0029), and a desire to have a configuration to provide redundant resources at both data centers (Wisner, ¶0035). Wisner discloses having plural data movers in both data centers to provide improved reliability in both the individual data center and in the system as a whole (Wisner, ¶0054). The database servers and data movers exist in similar configurations, each data center having a plurality. This similarity of structure would have provided motivation for one of ordinary skill in the art to apply similar active and backup

characteristics, as those shown with the data movers (Wisner, ¶0052), to the database servers. This would obviously have improved the overall reliability as seen by the user and desired by Wisner (Wisner, ¶0028). The result of this reconfiguration would have been database servers with the same failover structure and characteristics as those exhibited by the data movers.

Wisner additionally discloses keeping the backup data current (Wisner, ¶0037), but fails to disclose the transaction parameters to be broadcast during a transaction.

Song discloses communicating from the primary database server to the backup database servers by broadcast communication of a transaction unique identification, statements associated with the transaction operation, and control information from the primary database server to the backup database server (Song, col. 3, lines 60-66, where all the servers have instant transaction replication, which would inherently broadcast all information relating to a transaction received at one server to all other servers, this would include transaction identification to uniquely identify each type, operation information, and control information, all of which are essential to transaction replication)

It would have been obvious to one skilled in the art at the time of the invention to include the broadcast communication of Song in the invention of Wisner to ensure proper replication from the primary database to the secondary database.

This would have been obvious because Wisner discloses a strong desire to provide reliable and functional services (Wisner, ¶0003). Song provides an interface face that aids the reliable multi-server environment by ensuring that a true replicated state exists, and that no incorrect transactions are executed by any aspect of the system. It would have been obvious to

one skilled in the art at the time that the broadcasting of Song would have benefited Wisner by providing a more reliable system of execution.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wisner in view of Song, in further view of Hobbs, "Database Administration: Hot Standby for Rbd Systems", http://www.oracle.com/rdb/ product_info/html_documents/hotstdby.html, published 2001.

As per claim 20, Wisner additionally discloses providing first and second durability levels of operation wherein: employing the first durability level in the primary database server executes the transaction operation faster than the second durability level of operation (Wisner, ¶0037, where the first durability level "does not follow up on whether... changes were received", and the second durability level "waits for a message sent by the standby site", which would decrease the operation speed). Wisner and Song fail to disclose the second durability level including assurance that the transaction will be backed up in the event of a disaster on the primary.

Hobbs discloses employing the second durability level in the primary database server executes the transaction operation with the assurance that if the primary data center suffers a disaster, the plurality of backup databases in the backup data center will receive the transaction operation (Page 5, "Commit" section).

It would have been obvious to one skilled in the art at the time the invention was made to use the definition of the commit durability level to provide the assurance of disaster reliability in the system of Wisner.

This would have been obvious because Wisner, while not providing the details, promotes the use of the techniques provided by Hobbs that allow for the waiting of a message response (Wisner, ¶0037). The commit level of action includes this message wait and would have obviously been utilized to provide the most reliable system desired by Wisner.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wisner in view of Song, in further view of Oracle 8: SQL Reference, Release 8.0, published December 1997.

As per claim 18, Wisner discloses providing the plurality of database servers includes providing local databases therefor and executing the transaction operation includes the primary database server sending the transaction operation to the local database (Wisner, ¶0026). Wisner does not disclose waiting for a reply for this or any other aspects of the transaction. Wisner also fails to disclose the broadcast aspects of the database update.

Song discloses waiting for a reply after sending the transaction to the local database (Song, figure 2B, and col. 7, lines 2-20, where the operation remains locked in the loop waiting for the reply before the client disconnects). Song further discloses executing the transaction operation includes waiting for a reply from the local database to the primary database server and sending the reply to the client (Song, col.6, line 43, through col. 7, line 20, where the server gateway acts as the primary database access point to receive the reply from the local database, or primary replicated server). Song discloses communicating from the primary database server to the backup database servers by broadcast communication of a transaction unique identification, statements associated with the transaction operation, and control information from the primary database server to the backup database server (Song, col. 3, lines 60-66, where all the servers have instant transaction replication, which would inherently broadcast all information relating to a transaction received at one server to all other servers, this would include transaction identification to uniquely identify each type, operation information, and control information, all of which are essential to transaction replication). Song also further discloses releasing the

resources and closing the connection when a transaction is completely finished (Song, col. 7, lines 16-20)

It would have been obvious to one skilled in the art at the time of the invention to include the reply and broadcast communication of Song in the invention of Wisner to ensure proper replication from the primary database to the secondary database.

This would have been obvious because Wisner discloses a strong desire to provide reliable and functional services (Wisner, ¶0003). Song provides an interface face that aids the reliable multi-server environment by ensuring that a true replicated state exists, and that no incorrect transactions are executed by any aspect of the system while waiting for the completion of each transaction. It would have been obvious to one skilled in the art at the time that the broadcasting of Song would have benefited Wisner by providing a more reliable system of execution.

Song and Wisner fail to disclose a commit statement associated with the transaction operation that is an SQL statement.

Oracle 8: SQL Reference discloses having a commit command in a SQL standard form.

It would have been obvious to one skilled in the art at the time of the invention to implement a commit command in an SQL compatible manner.

This would have been obvious because the invention of Song discloses that upon completion the resources are all released and the database is ready to receive other transactions (Song, figure 2B). The commit command of SQL is defined as a command that releases the transaction locks and makes permanent any changes that were made (Oracle 8: SQL Reference, COMMIT, page 1), which is obviously the type of command initiated in the completion of the

algorithm of Song. Further, since the SQL reference states that SQL is accepted as the standard relational database management system language (Oracle 8: SQL Reference, Introduction, page 1), it would have been obvious to implement the commit command in SQL to provide this standard compatibility of use.

Allowable Subject Matter

Claim 12 is allowable.

Claims 13, 14, and 26-28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joshua A Lohn whose telephone number is (571) 272-3661. The examiner can normally be reached on M-F 8-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Beausoliel can be reached on (571) 272-3645. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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